

U.S.S.N. 09/991,152

Filed: November 16, 2001

**RESPONSE TO RESTRICTION REQUIREMENT****Remarks****Amendments to the Claim**

In response to the discussion with the examiner's supervisor, claim 1 has been amended into Jepson format. As described in the application, the invention is not the discovery of genetically engineered plants or bacteria that make polyhydroxyalkanoates (such organisms are known and indeed are the prior art, having been described in the patent literature since 1989). The problem applicants were addressing is how to produce high levels of medium chain length polyhydroxyalkanoates (see page 3, line 27 to page 4, line 1 and page 4, lines 26-28; page 6, lines 17-20). The solution, as described on page 7 at lines 3-5 is to provide in addition to the other enzymes for polyhydroxyalkanoate production, an acyl CoA synthase.

**Response to Restriction Requirement**

In the Office Action mailed July 9, 2004, the claims were divided into 19 groups:

Group I, claims 1, 13, and 20, drawn to a transgenic organism expressing a 3-hydroxyacyl-ACP thioesterase, and a method of engineering an organism and a method of making PHA by expressing said enzyme;

Group II, claims 2, 3, 6, 14, 15, 21, and 22, drawn to a transgenic organism expressing a 3-hydroxyacyl-ACP thioesterase and a 3-hydroxyacyl-CoA synthetase, and a method of engineering an organism to express said enzymes;

Group III, claims 2, 4, 14, and 21, drawn to a transgenic organism expressing a 3-hydroxyacyl-ACP thioesterase and *alkK* acyl-CoA synthetase, and a method of engineering an organism to express said enzymes;

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Group IV, claims 2, 14, and 21, drawn to a transgenic organism expressing a 3-hydroxyacyl-ACP thioesterase and acyl CoA transferase, and a method of engineering an organism to express said enzyme;

Group V, claims 5, 16, 17, 23, and 24, drawn to a transgenic plant expressing a 3-hydroxyacyl-ACP thioesterase, a 3-hydroxyacyl-CoA synthetase and a PHA synthase, and a method of engineering a plant to express said enzymes;

Group VI, claims 15, 16, 17, and 23, drawn to a transgenic plant expressing a 3-hydroxyacyl-ACP thioesterase and *alkK* acyl-CoA synthetase and a PHA synthase, and a method of engineering a plant to express said enzymes;

Group VII, claims 5, 16, 17, and 23, drawn to a transgenic plant expressing a 3-hydroxyacyl-ACP thioesterase and acyl CoA transferase and a PHA synthase, and a method of engineering a plant to express said enzyme;

Group VIII, claim 6, drawn to a transgenic organism expressing a 3-hydroxyacyl-ACP thioesterase and acyl CoA transferase and a PHA synthase and a hydroxyacyl-CoA synthetase;

Group IX, claim 6, drawn to a transgenic organism expressing a 3-hydroxyacyl-ACP thioesterase and acyl CoA synthetase (*alkK*) and a PHA synthase and a hydroxyacyl-CoA synthetase, and a method of engineering an organism to express said enzyme;

Group X, claim 7, drawn to the transgenic organism of claim 1, wherein the enzyme is modified;

Group XI, claims 8, 9, 11, 18, and 25, drawn to a transgenic plant expressing a 3-hydroxyacyl-ACP thioesterase, a 3-hydroxyacyl-CoA synthetase and a PHA synthase,

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and that may express a medium chain length 3-hydroxy fatty acid acyl CoA in a plant,  
and a method of engineering a plant to express said enzymes;

Group XII, Claims 8, 9, 11, 18, and 25, drawn to a transgenic plant expressing a  
3-hydroxyacyl-ACP thioesterase and *alkK* acyl-CoA synthetase and a PHA synthase, and  
that may express a medium chain length 3-hydroxy fatty acid acyl CoA in a plant, and a  
method of engineering a plant to express said enzymes;

Group XIII, claims 8, 9, 11, 18, and 25, drawn to a transgenic plant expressing a  
3-hydroxyacyl-ACP thioesterase and acyl CoA transferase and a PHA synthase, and that  
may express a medium chain length 3-hydroxy fatty acid acyl CoA in a plant, and a  
method of engineering a plant to express said enzyme;

Group XIV, claims 10, 12, 19, 26, and 29, drawn to a transgenic plant expressing  
a 3-hydroxyacyl-ACP thioesterase, a 3-hydroxyacyl-CoA synthetase and a PHA  
synthase, and that may express a medium chain length 3-hydroxy fatty acid acyl CoA in a  
plant, and a method of engineering a bacteria to express said enzymes;

Group XV, claims 10, 12, 19, 26, and 29, drawn to a transgenic plant expressing a  
3-hydroxyacyl-ACP thioesterase and *alkK* acyl-CoA synthetase and a PHA synthase, and  
that may express a medium chain length 3-hydroxy fatty acid acyl CoA in a plant, and a  
method of engineering a bacteria to express said enzymes;

Group XVI, claims 10, 12, 19, 26, and 29, drawn to a transgenic plant expressing  
a 3-hydroxyacyl-ACP thioesterase and acyl CoA transferase and a PHA synthase, and  
that may express a medium chain length 3-hydroxy fatty acid acyl CoA in a plant, and a  
method of engineering a bacteria to express said enzyme;

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Group XVII, claim 27, drawn to a method of screening for enzymes encoding a 3-hydroxyacyl ACP-thioesterase by co-expressing with PHA synthase and 3-hydroxyacyl-CoA synthetase;

Group XVIII, claim 27, drawn to a method of screening for enzymes encoding a 3-hydroxyacyl ACP-thioesterase by co-expressing with PHA synthase and CoA transferase;

Group XIX, claim 28, drawn to a method for increasing levels of C8 and C10 hydroxyacids or fatty acids of a plant oil by expressing transgenes encoding 3-hydroxyacyl ACP thioesterase.

With the exception of the last two groups including claims 27 and 28, now cancelled, the restriction requirement is believed to be rendered moot in view of the amendments to the claims as discussed above. It is understood from the discussion with the examiner's supervisor that since the independent claims encompass both bacteria and plants, that although these can be restricted into separate groups, the independent claims must be treated as linking claims. As becomes apparent from the portions of the specification referenced above, there are not seventeen different inventions but one: the discovery of the single enzyme required to produce polyhydroxyalkanoates of predominantly medium chain length.

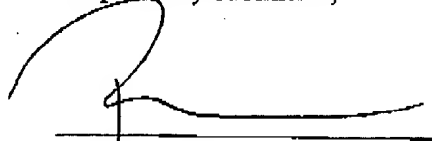
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Examination of all of claims 1-26, as amended, is earnestly solicited.

Respectfully submitted,



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